Abstract ID : 80

Title : Regression models for analyzing disturbance of marine mammals.

Category : Behavior

Student : Not Applicable

Preferred Format : Poster Presentation

Abstract : Whether a marine mammal is disturbed by an approaching vessel depends on the approach distance and many other variables. It will not usually be possible to control these variables experimentally when observing animals to detect disturbance or assess its impacts. Simple statistical relationships between single variables and a disturbance response are likely to be biased or lack power. Moreover, the data may be "censored" because some animals do not respond to the vessel or may be lost to observation before a response occurs. One way to accommodate these problems is to incorporate approach distance and other relevant variables into a regression model that accounts for the conditions under which the observations were made. We illustrate this approach with a study of disturbance by cruise ships of harbor seals hauled out on floating glacial ice. Observers aboard the ships recorded seal behavior, the distance and bearing to seals, weather statistics, and vessel characteristics while the ships conducted tours of Disenchantment Bay and Hubbard Glacier, Alaska. The likelihood that seals would leave the ice and enter the water was modeled in a semi-parametric extension of the Cox proportional hazards regression that is common for analysis of survival or other "time-to-event" data. The results showed that there was a strong, non-linear increase in the probability of seals being disturbed when approach distance decreased below 500 m. A seal ahead of the ship was more likely to be disturbed than a seal off to one side of the ship's track, indicating that the bearing angle to the seal was important, and there was an interaction between distance and bearing. The Cox model provides a flexible framework for investigating many other types of disturbance response and explanatory variables.